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## **SystEmatic review and meta-aNAlysis of infanT and young child feeding Practices (ENAT-P) in Ethiopia**

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# BMJ Open SystEmatic review and meta-aNAlysis of infanT and young child feeding Practices (ENAT-P) in Ethiopia: protocol

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## ABSTRACT

**Introduction** Infant and young child feeding (IYCF) is the cornerstone of infant and child survival, healthy growth and development, healthy future generations and national development. In spite of the importance of optimal nutrition in low- and middle-income countries, there has been no review conducted in Ethiopia. Thus, the aim of this systematic review and meta-analysis is to estimate the national coverage and identify the associated factors of IYCF practices in Ethiopia.

**Methods** PubMed, Scopus, EMBASE, CINAHL, EBSCO, Web of Science and WHO Global Health Library databases will be searched for all available publications from 1 January 2000 to 30 September 2017. All published studies on the timely initiation of breast feeding, exclusive breast feeding and timely initiation of complementary feeding practice in Ethiopia will be screened, selected and reviewed. Bibliographies of identified articles and grey literature will be hand-searched as well. Heterogeneity of studies will be quantified using Higgins's method where  $I^2$  statistic >80% indicates substantial heterogeneity. Funnel plots and Egger's regression test will be used to assess potential publication bias. The Newcastle–Ottawa Scale (NOS) will be used to assess the quality of evidence and risk of bias. Meta-analysis and meta-regression will be carried out to estimate the pooled national prevalence rate and an OR of each associated factor of IYCF practices. Narrative synthesis will be performed if meta-analysis is not feasible due to the substantial heterogeneity of studies.

**Ethics and dissemination** Ethical clearance is not required for this study because primary data will not be collected. The results of this systematic review and meta-analysis will be published in a peer-reviewed journal and presented at an (inter)national research symposium.

**Systematic review registration** This systematic review and meta-analysis has been registered with the International Prospective Register of Systematic Reviews (PROSPERO), registration number CRD42017056768.

## INTRODUCTION

The United Nations (UN) Convention on Child Rights declared that every infant and child has the right to good nutrition.<sup>1</sup> Infant and young child feeding (IYCF) is the cornerstone of infant and child survival, healthy

## Strengths and limitations of this study

- The latest published data will be reviewed and meta-analysed.
- The first meta-analysed national evidence on infant and young child feeding practices (IYCF) will be provided.
- This review and meta-analysis will be conducted in line with international guidelines and statements.
- A multilevel theoretical model for primary care intervention and research will be developed.
- The new evidence may not be representative of other nations and/or continents because only studies conducted in Ethiopia will be included.
- Inferences on causality may be difficult.

growth and development, a healthy future generation and national development.<sup>2</sup> Breast feeding is a natural practice by all mothers and has numerous benefits for the infant, mother and society at large.<sup>3</sup> It reduces the risk of infection and increases intelligence and educational attainment of the child; it also prevents maternal overweight, diabetes and cancer.<sup>2–3</sup> In addition, breast feeding maintains skin-to-skin contact that facilitates safe colonisation of the newborn skin by the mother's skin bacteria and prevents hypothermia.<sup>4</sup> Each year breast feeding saves the life of about 823 000 children and 20 000 mothers, and 302 billion dollars.<sup>3,5</sup> In low- and middle-income countries, recent data show that optimal breast feeding prevents about 12% of under-5 child mortality every year.<sup>6</sup> Other contemporary studies in Ethiopia, Ghana, Bolivia and Madagascar have shown that breast feeding prevents 20–22% of neonatal deaths.<sup>7–9</sup>

Suboptimal IYCF practices increase the risk of infant and child morbidity and mortality by up to fivefold.<sup>10–12</sup> Child malnutrition causes approximately 2.7 million deaths per year, 156 million stunting, 50 million wasting

and 42 million overweight or obesity.<sup>13</sup> In developing countries, approximately 25–50% of infant mortality is attributed to suboptimal IYCF practices.<sup>11 14</sup> The Central Statistical Agency (CSA) 2011 report shows that the neonatal mortality rate accounts for 42% of under-5 mortality in Ethiopia.<sup>15</sup> Due to the heterogeneous nature of barriers,<sup>4 16 17</sup> achieving optimum IYCF practices is the major challenge in developing and developed countries.<sup>18</sup> To improve, maintain and promote IYCF practices, the World Health Organization (WHO) defined eight core indicators and seven optional indicators.<sup>19</sup> This review will focus only on three core indicators: timely initiation of breast feeding (TIBF), exclusive breast feeding and timely initiation of complementary feeding (TICF). The rationale for choosing these indicators is that (1) studies have been published frequently on these indicators compared with others; and (2) these indicators address the feeding practice of newborn infants under 1-year-old, which is believed to be the critical period of growth and development.<sup>20</sup>

TIBF is the percentage of children born in the last 2 years who were breastfed within the first hour of birth.<sup>19</sup> The prevalence of TIBF in Eastern and Southern Africa is 59% compared with a global prevalence of 39%.<sup>14 21</sup> A systematic review of 18 studies conducted in Asia, Africa and South America showed that the prevalence of TIBF ranges from 11.4% to 83.3%.<sup>4</sup> A recent national survey report from 53 WHO European region countries showed that the prevalence of TIBF ranges from 5% to 84%.<sup>22</sup> According to the WHO rating on IYCF practices, the prevalence of 0–29% is poor, 30–49% is fair, 50–89% is good and 90–100% is very good.<sup>23</sup> TIBF has been associated with the place of residence and delivery,<sup>24</sup> educational status and postnatal advice on breast feeding,<sup>8</sup> unemployment benefit and social welfare,<sup>25</sup> maternal age and socioeconomic status,<sup>26</sup> marital status and breast feeding exposure,<sup>27</sup> parity,<sup>28</sup> antenatal care follow-up<sup>29</sup> and postnatal care follow-up.<sup>8</sup>

Exclusive breast feeding is defined as the proportion of infants who exclusively breast fed during the first 0–5 months after birth.<sup>30</sup> The prevalence of exclusive breast feeding in Eastern and Southern Africa is 42% compared with a global prevalence of 37%.<sup>14 21</sup> The prevalence of exclusive breast feeding in 53 WHO European region countries ranges from 21% to 30%.<sup>22</sup> Furthermore, the prevalence of exclusive breast feeding is 38–62% in India,<sup>31 32</sup> 42–44% in Iran<sup>33</sup> and 53% in Guatemala.<sup>24</sup> In accordance with the WHO rating on IYCF practices, a prevalence of 0–11% is poor, 12–49% is fair, 50–89% is good and 90–100% is very good.<sup>23</sup> Exclusive breast feeding has been associated with the number of children, maternal and child age, educational and marital status, wealth index, antenatal and postnatal care follow-up, place of delivery, sex of newborn, birth order, family income, parents' education and employment, mode of delivery and TIBF.<sup>8 24 29 33–36</sup> On the other hand, a prospective study conducted in India showed that there has been no significant association between exclusive

breast feeding and parental education, living conditions, antenatal care follow-up, birth weight, culture, postnatal breast feeding advice, previous breast feeding exposure and mothers' employment.<sup>31</sup>

TICF is defined as the proportion of infants aged 6–8 months who started additional solid or semi-solid or soft foods along with breast milk.<sup>19</sup> The prevalence of TICF is 63.6% in Egypt,<sup>37</sup> 57% in Nigeria,<sup>38</sup> 39.2% in Pakistan,<sup>39</sup> 84% in Sri Lanka<sup>40</sup> and 55% in India.<sup>41</sup> Furthermore, a Danish study showed TICF in 87% of infants.<sup>42</sup> According to the WHO rating on IYCF practices, a prevalence of 0–59% is poor, 60–79% is fair, 80–94% is good and 95–100% is very good.<sup>23</sup> TICF has been associated with antenatal and postnatal care follow-up,<sup>39</sup> household income,<sup>41</sup> educational and employment status,<sup>43 44</sup> maternal and child age,<sup>45</sup> parental confidence,<sup>46</sup> limited access to mass media,<sup>45</sup> and religion, exclusive breast feeding and no siblings.<sup>47</sup>

In Ethiopia, the prevalence of TIBF ranges from 41.6% to 83.7%,<sup>4 48</sup> exclusive breast feeding ranges from 13% to 79%<sup>49–51</sup> and TICF ranges from 42% to 63%.<sup>52–55</sup> According to WHO rating, TIBF and exclusive breast feeding coverage in Ethiopia are good whereas TICF is fair.<sup>23</sup> The most common identified associated factors are sex of newborn, educational status, occupational status, parity, antenatal and postnatal care follow-up and birth preparedness.<sup>52–55</sup>

To optimise national IYCF practices, the Ethiopian government has been training health professionals, developing and revising procedural manuals and implementing the community integrated management of childhood illnesses and Baby-friendly Hospital Initiative programme based on expert opinion, international research and adapted tools.<sup>56–58</sup> However, these international researches, guidelines and recommendations may not be effective in bringing behavioural, attitudinal and skill changes among mothers living in the different communities.<sup>11 18</sup>

Several systematic reviews and meta-analyses have been conducted on TIBF,<sup>4 17</sup> exclusive breast feeding,<sup>16</sup> long-term effects of breast feeding,<sup>59</sup> breast feeding and intelligence,<sup>60</sup> duration of exclusive breast feeding<sup>30</sup> and effectiveness of complementary feeding.<sup>61</sup> Given the population cross-sociocultural diversity and multi-dimensional nature of barriers of IYCF practices, these systematic reviews and meta-analyses do not provide all-inclusive evidence and none of them have provided national estimates specific to Ethiopia. Researches on IYCF practices have been appearing from different parts of Ethiopia and published frequently in peer-reviewed (inter)national journals. However, there is no systematic review and meta-analysis of IYCF practices.

Taken together, there is an urgent need for a systematic review and meta-analysis of studies conducted in Ethiopia. This is the first systematic review and meta-analysis of IYCF practices in Ethiopia. The aim of this study is to answer the following research questions: (1) What is/are the national prevalence and associated factors of TIBF?



(2) What is/are the national prevalence and associated factors of exclusive breast feeding? (3) What is/are the national prevalence and associated factors of TICF?

This systematic review and meta-analysis will provide consolidated data on the prevalence and associated factors of IYCF practices that would be useful for decision making. Besides, a multilevel theoretical model will be developed based on the Ethiopian context that would be useful for primary care intervention and research. To build the model, all negatively associated factors of IYCF practices will first be identified. Second, using the conceptual framework from the previous meta-analysis,<sup>4 16</sup> these identified factors will be operationalised and categorised into four levels. Level 1, called proximal factors which need immediate intervention, includes maternal work and maternity leave, mothers' or families' knowledge on breast feeding, difficulties in breast feeding, coexistence and family support, caregiver of child, child health, use of pacifier, maternal care satisfaction and guidance on breast feeding. Level 2, called proximal intermediate factors, includes place of delivery, maternity financing, breast feeding practice, intention to breast feed, mode of delivery, birth weight, gestational age and postpartum complication. Level 3, called distal intermediate factors, includes maternal nutrition status, desire for pregnancy, smoking, alcoholism, antenatal and prenatal visits and prenatal financing. Level 4, called distal factors, includes paternal education, household income, family size, breast feeding experience and marital status. Maternal age, sex of newborn and place of residence are non-modifiable or miscellaneous factors.

## METHODS AND ANALYSIS

### Protocol registration and review reporting

The present systematic review and meta-analysis has been registered in the International Prospective Register of Systematic Reviews (PROSPERO), University of York Centre for Reviews and Dissemination ([http://www.crd.york.ac.uk/PROSPERO/display\\_record.asp?ID=CRD42017056768](http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42017056768)) on 12 April 2017. Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 statement<sup>62</sup> is used to write this protocol (see online supplementary file 1 for a completed copy of the PRISMA-P checklist). Meta-analysis Of Observational Studies in Epidemiology (MOOSE) guideline<sup>63</sup> and/or PRISMA statement guideline<sup>64 65</sup> will be used to report the review results. The screening and selection process of the reviewed articles will be illustrated using a PRISMA flow diagram (see online supplementary file 2).

### Data source and search strategy

PubMed, Scopus, EMBASE, CINAHL, EBSCO, Web of Science and WHO Global Health Library databases will be searched for all available publications. Bibliographies of identified articles and grey literature will be hand-searched as well. Missed data will be handled by contacting the corresponding author/s. Search terms

and strings of TIBF and exclusive breast feeding are adapted from systematic review and meta-analysis studies by Esteves *et al.*,<sup>4</sup> Sharma *et al.*,<sup>17</sup> Boccolini *et al.*<sup>16</sup> and Khan *et al.*<sup>66</sup> Similarly, search terms and strings of TICF are adapted from studies by Dewey *et al.*<sup>61</sup> and Vissers *et al.*<sup>67</sup> The core search terms and phrases are 'breast feeding', 'breast milk', 'infant feeding', 'child feeding', 'time factors', 'start', 'first hour' and 'Ethiopia'. A comprehensive search strategy has been developed using appropriate Boolean operators in consultation with a medical information specialist and will be adapted to the above-mentioned databases. PubMed database searching strings and strategy are presented in online supplementary file 3.

### Inclusion and exclusion criteria

Cross-sectional, case-control and cohort studies will be included. In addition, regional or national survey reports will be included. Further inclusion criteria are: all studies should be conducted in Ethiopia, reports of the prevalence rate of IYCF practices based on the WHO IYCF definition<sup>19</sup> and at least one 'least adjusted' associated factor. All studies published in English from 1 January 2000 to 30 September 2017 will be included. Studies on premature newborn infants, infants in neonatal intensive care unit or a special care baby unit, low birth weight and mothers or infants with medical problems will be excluded. Likewise, commentaries, anonymous reports, letters, duplicate studies, editorials, qualitative studies and citations without full text will be excluded.

### Study screening and selection

First, all studies obtained from all databases will be exported to RefWorks version 2.0 software (<http://www.refworks.com>) and close and exact duplicates will be removed. Second, all studies will be exported to Microsoft Excel spreadsheet. Third, two independent reviewers will screen the title and abstract of each study. Agreement between the two reviewers will be accepted if Cohen's kappa coefficient is >0.600.<sup>68</sup> The screening will be repeated if the kappa value is <0.60. Fourth, after reaching good agreement, a full-text review will be performed. Finally, two investigators will independently extract the name of the first author and year of publication, region, study area, study design, study population, sample size, data collection procedure, IYCF practice, prevalence, least adjusted associated factors and effect sizes (OR) with 95% CIs using a structured data abstraction form (see online supplementary file 4).

### Risk of bias and quality assessment

The Newcastle–Ottawa Scale (NOS) will be used to assess the quality of evidence and risk of bias in cohort and case–control studies.<sup>69</sup> For cross-sectional studies, the adapted version of NOS will be used.<sup>69</sup> NOS has a good inter-rater reliability and validity.<sup>70 71</sup> It includes three categorical criteria with a maximum score of 9: a maximum of four stars allotted for 'selection'; a maximum of two stars allotted for 'comparability'; and a maximum of three stars allotted for 'outcome'. The quality of each study will be rated using the following



scoring algorithm:  $\geq 7$ , 'good'; 2–6, 'fair'; and  $\leq 1$ , 'poor'.<sup>72</sup> Only studies of 'good' quality will be selected for the final review and analysis. In addition, the strength of the evidence will be graded based on the three domains of quality, quantity and consistency.<sup>73</sup> The scoring of each item for each study will be summarised and presented using a table. Further, the quality assessment will be complemented by administering the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement.<sup>74</sup> Any disagreements will be resolved by discussion between the two reviewers; otherwise, the third reviewer will decide.

### Measuring outcome variables

TIBF is the percentage of newborns who breast fed within the first hour of birth.<sup>19</sup> Exclusive breast feeding is defined as the proportion of infants who exclusively breast fed during 0–5 months since birth.<sup>19 30</sup> TICF is defined as the proportion of infants who started additional foods and liquids along with breast milk between 6 and 8 months of age.<sup>19</sup>

### Data synthesis, publication bias and statistical analysis

The data will be synthesised based on the three selected IYCF practice core indicators. Funnel plots and Egger's regression test will be used to assess potential publication bias.<sup>75</sup> Based on the power and the number of studies that will be included in the analysis, other tests of publication bias will also be considered. Before meta-analysis, arc-sine transformation of the prevalence estimates will be used to adjust the effect of high prevalence studies on the pooled estimate.<sup>76</sup> Heterogeneity of studies will be quantified using the Higgins *et al.*<sup>77</sup> method where  $I^2$  statistic  $>80\%$  indicates substantial heterogeneity. In addition, heterogeneity will be assessed manually considering the study area and demographic characteristics of the study population. Meta-analysis and meta-regression will be carried out to calculate the pooled prevalence rate and an OR of each associated factor of TIBF, exclusive breast feeding and TICF separately. Effect size will be estimated using fixed-and random-effect models and the model that provides a higher estimate will be reported.<sup>78 79</sup> In addition, a separate forest plot will be constructed. Narrative synthesis will be performed if meta-analysis is not feasible due to the substantial heterogeneity of studies. The data will be inputted and analysed using Review Manager version 5.3.5 software for Windows.<sup>80</sup>

### Subgroup analysis

Subgroup analysis will be carried out based on the regional states and place of residence (urban versus rural) where the study is conducted as defined by the Federal Democratic Republic of Ethiopia.

### Ethics and dissemination

Ethical clearance is not required for this review because primary data will not be collected. The results of this systematic review and meta-analysis will be published in a peer-reviewed journal and presented at an (inter) national research symposium.

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**Contributors** TDH conceived and designed the study. TDH and BST developed the search strategy. TDH, M.AI, NTS, SHM, MMB and BST wrote the protocol. All the authors read the manuscript and have given the final approval for publication.

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**Competing interests** None declared.

**Ethics approval** Ethical clearance is not required for this review because primary data will not be collected. The results of this systematic review and meta-analysis will be published in a peer-reviewed journal and presented in (inter)national research symposium.

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